Use of Thermoplastic-Composite Sheetpile to Prevent Shoreline Erosion Caused by a Migrating Estuarine Channel: Section 227 Seabrook, NH Demonstration Project

by Kevin Knuuti, P.E.[1] and John Winkelman[2]

The town of Seabrook is located on the coast of New Hampshire, just north of the New Hampshire-Massachusetts border. Seabrook Harbor is characterized by a major tidal inlet, large shoals (including a flood-tidal delta), and three major tributaries. One of these tributaries, the Blackwater River, recently changed course, causing severe bank and bar erosion and associated harbor shoaling. Bank erosion presented a significant threat to infrastructure and bar erosion resulted in a significant loss of habitat from New Hampshire's largest clam resource. The associated harbor shoaling required an increase in maintenance dredging frequency from once every five to six years to once per year.

Together, the State of New Hampshire, the University of New Hampshire, the New England District of the Corp of Engineers, and the Corps' Engineering Research and Development Center developed a solution to this problem, under the Section 227 Program, that involved constructing bulkheads at each end of the cut formed by the new path of the Blackwater River. The former path of the Blackwater River was dredged to its previous depth and cross-sectional geometry and the dredged material was placed between the constructed bulkheads. This forced the Blackwater River back to its previous course, away from the threatened infrastructure and the commercial harbor. Dredged material was of the proper quality and was placed to the proper elevation to restore the clam habitat that had been lost. As an innovative step, unique sheetpile, made of a thermoplastic-composite material, was used to construct the bulkheads. This was the first use of this type of sheetpile in a marine environment and resulted in some construction difficulties and also the development of some new construction techniques.

Presently, construction of the project has been completed and detailed monitoring of the sheetpile bulkheads, the dredged channel, and the surrounding estuarine environment is underway. Initial analysis of monitoring data indicates that the project is performing as expected in many ways and much better than expected in other ways. The thermoplastic-composite sheetpile has proved to be more resilient and durable than either steel or fiberglass sheetpile, in some instances, and is expected to possibly reduce maintenance costs and increase the life of the project.

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